world, in the form of a map of the Yellowstone Park on a scale of two miles to an inch, a scale sufficiently large to show all details necessary to the geologist, or the traveler. The topography is represented by contour lines, at approximate intervals of one hundred feet. This map, as well as the others published by this survey, are admirable illustrations of relief-effect by means of contours; and they not only express the relief, but the absolute and relative elevations.

From a study of this map, we find that the greater part of the surface of the Park consists of high rolling plateaus, broken by stream beds, cliffs and cañons. Several small groups of mountains diversify the surface, among them the Red mountains, in the southern part, rising two thousand feet above the general level, or more than ten thousand feet above the sea—and the Washburn group, near the middle of the Park. This group has the form of a horseshoe, opening towards the east. The eastern border of the Park is occupied by a high, rugged range, to which has long attached the name of Yellowstone Range. Index peak; the highest measured peak in this range, exceeds 11,700 feet in height. In the north-western corner of the Park is the southern extremity of the Gallatin range, culminating in Electric Peak, a magnificent summit, 11,155 feet above the sea, which overlooks almost the whole Park.

The mean elevation of this reservation appears to be not far from 8000 feet, an elevation so great in this latitude as to presuppose an almost arctic climate. The lowest point within its limits is at the mouth of Gardiner's river, on the Yellowstone, which is 5360 feet.

Marked features of the reservation are the low, indefinite divides and the abundance of lakes and marshes. In several cases we note marshes extending across divides and making "two ocean rivers," phenomena by no means as uncommon as are popularly supposed. The lakes, principal among which are Yellowstone, Shoshone, Lewis and Heart, cover nearly 200 square miles out of the total area of the park, which is estimated at 3312 square miles.

Many newly discovered groups of hot springs and geysers appear, for the first time, on this map, among which should be mentioned the large and fine groups near the head of Gibbon's fork of the Firehole, the discovery of which has been previously noticed.

The engraving of these maps, by Bien, of New York, is one of the best specimens of his very excellent work.

MICROSCOPY.[1]

HINTS ON THE PRESERVATION OF LIVING OBJECTS, AND THEIR EXAMINATION UNDER THE MICROSCOPE.—I will now give a short summary of the most useful apparatus for the examination of liv-

[1] This department is edited by Dr. R. H. WARD, Troy, N. Y.

ing objects. The simple glass slip, three inches by 1 inch, or better, a ledged stage-plate three inches by one and a half inches, with narrow strip of glass cemented along one edge. One of these, with cover-glass, is often all the apparatus necessary to use with small infusoria and free-swimming rotifers, and is also occasionally available with a little management for larger objects, either free or attached. Manipulation with these I cannot better describe than in the words of Judge Bedwell in his description of what I call Bedwell's rotifer-trap.

"Take a plane glass slide, on it drop one or more of the rotifers in a drop of water, about half an inch in diameter, and draw off the surplus water if any, carefully with the empty pipette; then fray out a very, very small portion of cotton wool (I always use a watchmaker's glass in the eye to do all such operations) until it is much extended, and spread out and lay this on the drop. Upon that lay the thin microscopic glass, the thinner the better, and then set up the capillary attraction by gently touching it with a needle. Draw off any superfluous water from the edges with the pocket-handkerchief, and you will have a little wilderness of wool in in which the rotifer is restrained in its movements, protected from pressure, and within reach of very high powers. The amount of wool depends on the size of the rotifer. Hydatina requires more depth than Rhinops. The same plan answers equally well for all roving animals. The Goduridæ in particular, when placed in deep glass cells, are easily seen by this apparatus, and it saves many a weary and vexatious five minutes with the compressorium, which even at the best, requires with living animals extraordinary patience. The rotifers are easily found and secured with the pipette and a watchmaker's glass in the eye after a very little practice. Mr. Bolton's studio is of the greatest value to naturalists, and cannot be too well known, for to those who have not time to look for specimens it is a great privilege to be able to purchase them."

Another simple apparatus I call the Wills' compressorium. Most forms of compressorium are useless—all are expensive. Those who try the following will be surprised at the efficiency of the apparatus. Two pieces of thin glass are cemented on to a glass slip in the shape of the letter **L**, but with the two strokes of the letter about equal in length, and another thinner and longer one is fixed longitudinally, thus **L**——. The **L** serves to retain in position a square slip of cover glass placed, of course, not on the **L**, but inside it; the horizontal piece, which should be ground to a bevel on its top edge before fixing it, serves to carry a fine needle, the point of which is inserted beneath the edge of the cover glass. This point being tapered, it is easy to increase or diminish the thickness of a film of water carried between the cover and the slip by pushing the needle further in or out, and so to form a cheap and effective compressorium.—*T. Bolton in English Mechanic.*

METHOD OF SEPARATING ORGANISMS FROM WATER.—In order to reduce the quantity of water containing infusoria, obtained by means of a collecting bottle or otherwise, an easy and effective method is to allow the liquid to stand in a bowl until it has settled, and then take up the water by means of a sponge placed in a pouch made of fine silk. If the water be allowed to soak into the sponge very gradually and a slight pressure be given before removing it from the bowl so as to wash away any adherent particles, even the finer forms of animalculæ diffused through a pint of water may be left in great abundance in a quantity of water not larger than a tablespoonful.—*M. A. Veeder.*

——:o:——

SCIENTIFIC NEWS.

— One of the best and most successful fish culturists and practical ichthyologists in America has passed away. James W. Milner was born in Kingston, Ontario, January 11, 1841; he came to Chicago when about five years old, and he grew to manhood there, showing even as a child great, almost excessive devotion to study, the effects of which impaired his physical condition on more than one occasion.

He left the Northwestern University, before graduating, to take a place as a private soldier in the 1st Illinois Light Artillery. During his military service, which lasted until 1864, he exhibited an enthusiastic patriotism, courage and endurance, with a kindly interest in the comfort and welfare of those about him which made him a universal favorite. He passed through many of the severest battles of the war and voluntered at Vicksburg for the rescue of the wounded after the disastrous repulse of the "forlorn hope." Doubtless the privations which he endured somewhat undermined his constitution, and he took to farming, under the persuasion of his father, in hope of recovering in this way some of his lost vigor.

About 1870 his work in the direction of natural history led to a correspondence with Prof. S. F. Baird, and afterwards to his appointment as Deputy U. S. Fish Commissioner, which he retained until his death. Among his associates at the Smithsonian Institution, there was a general appreciation of his abilities as an observer and his qualities as a man. His chief interest and field of work lay in the culture, hatching and transportation of various fishes and invertebrates for economical purposes, which necessitated a very thorough study of their habits and conditions in a state of nature.

Among the works published by him the most noteworthy articles are those relating to the fishes of the great lakes, especially the whitefish, and his study of the graylings. He was naturally modest and given to underrating the value of his own work, and hence was not easily persuaded to publish his studies. On the